

REMARKS

Initially, Applicant expresses appreciation to the Examiner for the courtesies extended in the recent telephone discussions with Applicant's representatives regarding the present application, and for scheduling an in-person interview with Applicant's representatives, which will take place on February 8, 2007.

The Office Action, dated October 6, 2006, considered and rejected claims 1-22. Claims 1, 6-8, 13-15, and 20-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Brown (U.S. Patent No. 6,101,585) in view of Spirakis (U.S. Patent No. 5,867,668). Claims 2, 5, 9, 12, 16 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Brown (U.S. Patent No. 6,101,585) in view of Spirakis (U.S. Patent No. 5,867,668), and further in view of Mani-Meitav (U.S. Publ. No. 2005/0216788). Claims 3, 4, 10, 11 17 and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Brown (U.S. Patent No. 6,101,585) in view of Mani-Meitav, and further in view of Lee (U.S. Patent No. 6,078,930).¹

By this paper, claim 23 has been added, while no claims have been added or cancelled. Accordingly, following this paper, claims 1-23 remain pending, of which claims 1, 8 and 15 are the only independent claims at issue.²

As discussed with the Examiner, the pending claims generally relate to methods, systems, and computer readable media for backing up and restoring data. Applicant respectfully submits that the art of record fails to disclose or suggest each and every limitation as recited in the pending claims, and further that the Office Action fails to establish, or even assert, a prima facie case of obviousness. For example, the Office Action fails to even address each and every claim limitation and assert that each and every limitation is taught by the cited references.

For example, with regard to the claim listing above, and as presented in claim 1, for example, Applicant's invention is generally directed to a computer-readable medium for backing up and restoring a data set of a node in a distributed system. As recited in claim 1, for example, the computer-readable medium includes computer-executable instructions for performing various

¹ The Advisory Action rejects claims 1, 2, 5-9, 12-16 and 19-22 on the same grounds set forth in the Office Action. Although the prior art status of the cited art is not being challenged at this time, Applicant reserves the right to challenge the prior art status of the cited art at any appropriate time, should the need arise. Accordingly, any arguments made herein should not be construed as Applicant acquiescing to any prior art status of the cited art.

² Support for the new claim can be found throughout Applicant's original disclosure, including at least the disclosure found in paragraph 16 of the originally filed application.

acts. Such acts include, for example, initiating a backup operation and setting state data of the data set to indicate that the data set *is in a backed up state*. Thereafter, a snapshot of the contents of the data set is taken, in which the snapshot includes the data of the data set *and the state data indicating that the data set is in a backed up state*, as well as a plurality of changes each identified by a replication identification number of the node and a serial number. After taking the snapshot, the state data of the data set is also reset to indicate that the data set is in normal operation.³

While Brown and Spirakis are generally directed to systems for backing-up data, Applicant respectfully submits that the cited art, whether alone or in combination, fails to teach and suggest each and every limitation of the present invention. For example, the cited art fails to disclose or suggest, and the Office Action fails to assert that it discloses or suggests, among other things, a data backup system in which state data of the data set is set to indicate that the data set is in a backed-up state and a *snapshot is taken* of the data set which includes *state data indicating that the data set is in a backed-up state*, as recited in combination with the other claim elements.

In particular, the Office Action asserts that Brown teaches "setting state data of the data set to indicate that the data set is in a backed up state." (Office Action, p. 2). The Office Action fails, however, to even allege that Brown teaches that a snapshot includes state data *indicating that the data set is in a backed-up state*, as recited by Applicant in the above claims. Moreover, a review of Brown shows that such a teaching is absent. For example, as expressly noted in Applicant's response and Amendment "A" filed July 20, 2006, Brown teaches the opposite in that it teaches a system in which a snapshot is taken of an unmodified data set in which state data *within the snapshot* is modified, rather than the state data contents of the data set.⁴ Moreover, as

³ Claims 8 and 15 are directed to a method and system, respectively, and generally correspond to the computer-readable medium recited in claim 1.

⁴ In particular, Brown discloses a backup mechanism for incremental backup operations that properly backup files that are modified concurrently with the backup operation. (Col. 3, ll. 15-23). As disclosed in Brown, files are stored in a file system (or container) which has its own ID number. (Col. 4, ll. 65-67). In addition, each file is associated with an archive bit change number ("ABCN") attribute. (Col. 6, ll. 5-10). The ABCN attribute is used to identify changes to files, and is incremented each time the associated file is modified. (Col. 6, ll. 15-18). When a back-up operation is performed, the contents of a data container are duplicated as a read-only, snapshot container which is virtually an identical copy of the original container. (Col. 5, ll. 6-17). During the creation of the snapshot, however, the state of most file attributes remains the same. (Col. 5, ll. 48-51). The container ID associated with each file, however, does not remain the same. In particular, the file system converts the container ID *in the snapshot* to reflect that the files are on the snapshot rather than the original container. (Col. 5, ll. 52-54; Col. 6, ln. 5). Subsequently, when the file system wishes to indicate that a backup has been made, it converts the container ID *on the snapshot* so that it can compare ABCN numbers and determine whether a file has been updated since the backup was initiated. (Col. 6, ll. 26-40).

expressly noted by the Examiner in the Office Action, Brown fails to disclose "setting state data of the data set to indicate that the data set is in a backed up state." (Office Action, p. 3). Accordingly, inasmuch as Brown fails to teach setting state data to indicate that the data set is in a backed up state, it also clearly fails to teach taking a snapshot of a data set which includes state data set to indicate that the data set is in a backed up state.

The assertions in the Office Action, and the teachings of the secondary Spirakis reference, are also devoid of such a teaching. In particular, the Office Action asserts "that Spirakis teaches a method in which a backup is initiated by setting the state to a backup state, and upon completion of the backup the state is changed to a normal state." (Office Action, p. 3). Even if such a statement were true, the Office Action fails, however, to even assert that such state data is included in a snapshot of the data set, as recited in combination with the other claim elements.

Moreover, a review of Spirakis demonstrates that such a teaching is also absent from Spirakis. In particular, Spirakis teaches a system for transferring and storing data in a highly parallel computer network. In the system, a state indicator is set *to indicate that a data transfer from a primary storage device to a secondary storage device should occur.* (Abstract; Col. 2, ll. 41-44; Col. 4, ll. 29-39). Such a state indicator is stored in external memory 23 or in memory 21 on a primary storage device 14. (Col. 3, ll. 47-40; Col. 4, ll. 25-28). The state indicator is then used to backup data from a computer 18a, (Col. 4, ll. 52-58), which data may be transferred to a primary data source 14 (at which state indicator 38 is accessed or stored), and subsequently to a secondary data source 16. Accordingly, Spirakis discloses that a state indicator at a primary storage device is used to indicate when data from a separate computing device is to be backed up. Spirakis fails, however, to disclose or suggest that the state data itself is included in the backed up or included in a snapshot of a data set that is being backed up.

Moreover, in contrast to the pending claims, in which the state data indicates that the data set is *in a backed up state*, Spirakis discloses that a state indicator is used to indicate that data *needs to be backed up*. In other words, Spirakis discloses that the state indicator indicates that the data set *has yet to be backed up*, rather than that the data set is *backed up data*, as so identified in the above claims so as to allow, for example, the snapshot of the data set to also indicate that it is a backed-up set of data. Furthermore, inasmuch as the state indicator indicates that the data needs to be backed up, there is no reason to carry such an indicator forward in a

snapshot of the data set, inasmuch as the data set would then have already been backed up and no longer needs to be backed up as indicated by the state indicator.

Accordingly, for at least these reasons, Brown and Spirakis fail to disclose or suggest each and every limitation of the pending claims. In particular, among other things, Brown and Spirakis fail to disclose: (1) setting state data to indicate that a data set *is backed up*; and/or (2) that a snapshot is taken of a data set, including its related state data that indicates that the data set is backed up. Moreover, as noted above, the Office Action doesn't even assert that the references teach a snapshot that includes state data indicating that the data set is backed up.⁵

In view of the foregoing, Applicant respectfully submits that the other rejections to the claims are now moot and do not, therefore, need to be addressed individually at this time. It will be appreciated, however, that this should not be construed as Applicant acquiescing to any of the purported teachings or assertions made in the last action regarding the cited art or the pending application, including any official notice. Instead, Applicant reserves the right to challenge any

⁵ A prima facie case of obviousness is not met with respect to independent claims 8 and 15, and all dependent claims, for at least the same reasons as those set forth for independent claim 1. Moreover, with respect to claims 3, 4, 10, 11, 17 and 18, which were rejected *without* reliance on Spirakis, it is also respectfully noted that inasmuch as the Office Action acknowledges that Brown fails to teach either setting state data to indicate that data is in a backed up state and resetting the state data to a normal state, which limitation is included in each of claims 3, 4, 10, 11, 17 and 18, and that Mani-Meitav and Lee are not asserted to supply such a teaching, a prima facie case of obviousness is also not met nor asserted with respect thereto.

Further, with respect to independent claim 15, Applicant also notes that a prima facie case has not been met. In particular, claim 15 recites a system which includes a replication server for replicating changes made to a data set to other nodes in a distributed system, in combination with the other recited elements. For this teaching the Office Action relies upon the backup application 102 illustrated in Figure 1. It is noted, however, that in contrast to the replication server, recited by Applicant, which replicates changes made to a data set to other nodes in a distributed system, Brown discloses a backup application which backs up file contents and copies the files to storage devices. (Col. 5, ll. 21-26).

The rejections of claims 2, 9 and 16 are similarly deficient. In particular, Applicant respectfully submits that the cited art fails to disclose or suggest changing the replication identification number of the node from an old value used before the backup operation to a new value in response to detecting that the restored data set indicates that the data set is in the backed up state, as recited in combination with the other claim elements. For this teaching, the Office Action states that it would be inherent in Brown that when a node is brought back online a new IP/GUID would be assigned. Applicant respectfully disagrees inasmuch as there are various ways a computer system may operate with regard to its identification number such that it is not necessary that the IP/GUID be newly assigned. For example, Applicant notes that the node may operate with a static IP/GUID such that it maintains the same IP/GUID. Moreover, Applicant notes that Brown does not have any disclosure even directed to the use of an IP/GUID. Further, even were the assertion by the Examiner correct, to which Applicant does not acquiesce, assigning a new IP/GUID when a node is brought back online is not changing a replication identification number of the node *in response to detecting that the restored data indicates that the data set is in the backed up state*. Detecting that a node is now online or offline is not the same as detecting when data is indicated to be backed up.

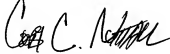
With respect to claims 3, 10 and 17, Applicant respectfully submits that the cited art fails to teach embodiments for storing a lowest uncommitted serial number corresponding to a *lowest serial number* of changes made to the data set that are not yet committed prior to taking the snapshot, as recited in combination with the other recited claim elements. The Office Action acknowledges that Brown and Mani-Meitav fail to disclose such a teaching. To remedy this failure, the Office Action relies on the disclosure in the Lee reference relative to the use of a recovery timestamp value. (Col. 4, ll. 29-35). Applicant notes, however that the recovery timestamp value is an indication, from a logical clock, of the *relative time at which changes were last performed*. (Col. 4, ll. 24-28). Accordingly, Lee discloses use of a timestamp to indicate when changes were last made. The timestamp does not correspond to a *lowest one of a serial number* of changes made that are not yet committed. In fact, Lee does not appear to have any disclosure regarding committed or uncommitted changes.

of the purported teachings or assertions made in the last action at any appropriate time in the future, should it arise. Furthermore, to the extent that the Examiner has relied on any Official Notice, explicitly or implicitly, Applicant specifically requests that the Examiner provide references supporting the teachings officially noticed, as well as the required motivation or suggestion to combine references with the other art of record.

In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview, the Examiner is requested to contact the undersigned attorney.

Dated this 5th day of February, 2007.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Rick D. Nydegger", written over the printed name.

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